



Accelerate Control System Development

- Validate embedded controllers before physical prototypes, reducing development risk and program costs.
- Simulate real-world operating conditions, faults, and network communications in a safe, repeatable environment.
- Automate verification and regression testing to improve software quality and shorten development cycles.

Flexible hardware-in-the-loop simulation for batteries, engines, motors, ADAS, ECUs, thermal systems, and complete powertrains. HILS replaces physical test assets with real-time simulation models, enabling engineers to evaluate control strategies faster, reduce prototype and test-cell costs, and safely test scenarios that are difficult, costly, or impractical to recreate with hardware alone.



High-Fidelity Simulation

Connect production controllers to real-time models that accurately represent vehicle, powertrain, battery, motor, thermal system and component behavior.



Automated Validation

Execute repeatable test procedures, fault insertion routines, and regression testing to verify controller performance throughout development.



Flexible Integration

Support a wide range of I/O, communication protocols, and third-party tools with architectures tailored to specific testing requirements.

Typical HILS Applications

- Battery Management Systems (BMS)
- Engine Control Modules (ECM)
- Motor & Inverter Controls
- ADAS and Vehicle Control Systems
- Thermal Management Systems
- Hybrid & Electrified Powertrains
- Transmission Controls
- Fuel Cell Systems
- Vehicle Network Validation

Key HILS Capabilities

- Sensor & Actuator Simulation
- Fault Injection & Failure Mode Testing
- CAN, CAN FD, LIN & Ethernet Networks
- Automated Test Execution
- Regression Testing
- Rest-of-Bus Simulation
- Data Acquisition & Analysis
- Scalable I/O Architectures
- Third-Party Tool Integration



HILS Systems

Complete HILS Simulation Systems racks or standalone ADX for ECU Controller Logic Validation. Available to simulate a variety of components including engines, batteries, motors, e-axes, and more.



Helios

Scalable architecture features integrated I/O boards, built-in fault simulation, and high-speed inter-node communication for multi-node real-time simulation.



Procyon

A high-speed, customizable real-time simulation and control platform designed for complex hardware-in-the-loop testing and advanced laboratory R&D.



Selene

A compact, Simulink-based rapid prototyping platform for control logic validation and ECU development. Operating standalone with multi-voltage power support, it converts CAN signals and streamlines prototyping.

Bring Your Models. Run Them in Real Time.

A&D HILS platforms support models developed with industry-standard modeling and simulation tools, allowing engineering teams to leverage existing model investments and development workflows.

- MATLAB® & Simulink®
- Simscape™
- GT-SUITE®
- AMESim®
- CarMaker®
- SCALEXIO Models
- ETAS® ASCET
- FMI/FMU-Compliant Models
- C/C++ Real-Time Models
- Custom In-House Models

A&D Technology delivers complete HILS solutions including system design, model integration, custom software development, automation, installation & commissioning, training, and ongoing support. From standalone controller validation to full vehicle simulation environments, A&D helps test teams build scalable validation platforms that evolve with program requirements.